

**RENSSELAER POLYTECHNIC INSTITUTE
GAERTTNER LINAC CENTER
110 8th St. Troy, NY 12180**

RPI
FOREIGN TRIP REPORT
WPEC20190624

DATE: July 10, 2019

SUBJECT: Report of Foreign Travel to Paris France – Yaron Danon, RPI.

TO: Angela Chambers, Manager US DOE NCSP, Office of the Chief of Defense Nuclear Safety, NA-511.

FROM: Yaron Danon, Rensselaer Polytechnic Institute, Troy, NY 12180

MEETING TITLE: 31th Meeting Working Party on International Nuclear Data Evaluation Cooperation

MEETING LOCATION: NEA Headquarters, Boulogne-Billancourt, France

MEETING DATES: June 24-28, 2019

ATTENDEES ON BEHALF OF NCSP: Yaron Danon

MEETING BENEFITS TO NCSP:

The meeting occurred during the week of June 24-28, 2019. During that week there were several parallel sessions with interest to NCSP that Danon attended:

Session	Date	Participant/Presenter
SG-44 (covariance data)	6/24	Y. Danon - Participant
SG-C (high priority list)	6/25	Y. Danon - Participant
SG-45 (VANDAL)	6/26	Y. Danon - Participant
WPEC	6/27-6/28	Y. Danon- Presenter and Participant

All WPEC and subgroup meetings included topics in which NCSP supported research performed at RPI. Danon gave a presentation during the WPEC meeting on recent US measurement activities, the data presented included material presented during the last CSEWG meeting and some updates from ND-2019.

The meeting provides an opportunity to collaborate with other ND communities such as JENDL and JEFF. The collaboration allows better planning of NCSP (and NNL) related ND experiments and evaluation activities. In some cases, this meeting enables access to experimental and/or evaluated data obtained elsewhere.

MEETING PURPOSE:

The purpose of WPEC and adjacent subgroup meetings is to foster international collaboration and coordination between the different nuclear data evaluation programs around the world. That includes the ENDF, JEFF, JENDL and BROND, CENDL projects and other invited delegates.

SITES VISITED:

NEA Headquarters, Paris, France.

ABSTRACT:

The traveler participated in the WPEC meeting in NEA Headquarters, Paris, France. Danon is an official member of the US ENDF delegation representing CSEWG measurement committed. Danon presented a report on US measurement activity during FY18-19 mostly based on reports provided during the November 2018 CSEWG meeting with updaters from ND-2019. He is currently the only US member of subgroup C (high priority list), and a member of subgroups 44 (Investigation of Covariance Data in General Purpose Nuclear Data Libraries), and subgroup 45 (Validation of Nuclear Data Libraries (VaNDaL)).

**Access to the information in this report is limited to those indicated
on the distribution list and to U.S. Government Agencies and their Contractors.**

REPORT OF FOREIGN TRAVEL

**Yaron Danon
NEA Headquarters, Boulogne-Billancourt, Paris, France
June 24-28, 2019**

PURPOSE OF TRAVEL

The purpose of the travel is to participate in the WPEC meeting as an official member of the US delegation and to present a report on US experimental ND work during FY18-19, and to participate in subgroups C, 44 and 45.

REPORT

Subgroup C

Danon is a member of Subgroup-C the high priority nuclear data list (HPRL) which is accessible at <http://www.oecd-nea.org/dbdata/hprl/>. This list prioritizes needs for nuclear data measurements and evaluation. In Europe, the list is used to justify new measurements. HPRL contains 100 requests for measurements and evaluations, 30 are high priority, 6 are general requests and 64 are special quantity requests (integral/dosimetry by activation). The status of the list was discussed and what qualifies a request as completed such that it can be removed from the list and. New feature in the HPRL include:

- Special Purpose Quantities (SPQ) for dosimetry and standards now have direct access.
- References of recent experiment, evaluation, or validation of all pending entries were updated.
- Entry Status filed was updated to show “Work in progress”, “Pending new evaluation or validation”, or “Completed”
- “Completed” entries, are no longer visible by default
- More updates to the site are pending including complete renovation to better match the update NEA content management system (CMS). A demo of the prototype of new site was given during the subgroup meeting.

Over the last year several entries were moved to status of “Pending new evaluation or validation”, This includes Gd-155-157 resonance evaluation. Prompt fission gamma spectrum for Pu-239 and U-235, Am-241(n,f), Pu-242(n,g), Na-23(n,n’). U-235 (n,g) was moved to “completed”.

Two new HPRL entries B-209(n,g) and Pu-239(n,tot) and update for Pu-239 alpha ratio.
1 SPQ dosimetry request Pu-239(n_{th},f) high energy PFNS.

The current mandate of SG-C runs until June 2020, a report/paper is expected by that time and a renewal request will be submitted to NEA.

WPEC

A report to WPEC was presented by Danon on Thursday and included reports on experimental activity in 7 US laboratories including:

1. U-235 and Pu-239 prompt fission neutron spectra measurements from Chi-Nu at LANSCE (LANL)
2. Status update on NZ reaction studies at LANSCE (LANL)
3. ORNL neutron cross section measurements for the US Nuclear Criticality Safety Program (ORNL)
4. Nuclear Data Measurements and Analysis at RPI (RPI)
5. NNL Nuclear Data Measurements and Analysis at RPI (NNL)
6. Neutron Cross Sections at UKAL: C, Si, Li, F (University of Kentucky Accelerator Laboratory)
7. Nuclear Data Measurements from LBNL and UC-Berkeley (Berkley)
8. Recent work on neutron cross section standards (NIST)

The information in the US reports is mostly from the presentation given during the CSEWG in November 2018. Following my presentation on US measurements, there was a much interested and a discussion on the Ta transmission validation experiment for the URR (NCSP sponsored measurement at RPI). In this discussion, it was suggested that more such measurements would be useful; U-238 was discussed as a higher priority material to measure next. A summary of the meeting and the presentation are available at: <https://www.oecd-neo.org/science/wpec/meeting2019/>

Other interesting measurement reports included:

China

The nuclear data capabilities in china are on the rise with several new experimental facilities going online. Their report included:

- Pu-239 capture by surrogate reactions (alpha on U-236 results in compound Pu-240).
- U-235 (n,2n) cross section, alpha+Th-232 angular distribution.
- Capture (C₆D₆) on Tm-169, Nb-93, U-238.
- Fe (n,ng)
- Fe(n, alpha) in Peking university, published in PRC, used twin ionization chamber.
- HPGE for inelastic gammas from Fe relative for Cr(n,ng)
- Li(n,T) using silicone detector array.
- B-10(n, alpha) using same system with Si detectors.
- FIXM – ionization chamber for fission cross section measurements.

Europe

New educational project for accelerator based measurements.

nTOF – may measurements we presented in ND2019. Discussed; Np-237(n,f), Am-241(n,f) and (n,g), S-33(n,alpha), U-233 alpha ratio above 1 eV, Th-230(n,f), C(n,p/d).

JRC Geel – resonance evaluation for Bi-209, transmission and rapture on Rh-103, Pu-242 fission. New resonances to 4 keV. Gd-154,155,157 (n,g) (samples seem too thick for the thermal region.

Japan

Capture using HPGe (pulse height weighting), total cross section of Am-241 using Li-Glass in the low energy region.

Reports from each evaluation project were presented focusing on the latest experimental and evaluation efforts. WPEC also reviews and approves new subgroups. A new subgroup on “Advances in Thermal Scattering Law Analysis” was proposed and was accepted by WPEC. Another new subgroup proposal for “Reproducibility in Nuclear Data Evaluation” was proposed and also accepted

WPEC Meeting participants

	Given Name	Surname	Representing	Notes
1	David	BROWN	UNITED STATES	<i>EG-GNDS</i>
2	Roberto	CAPOTE	IAEA	<i>Remote</i>
3	Jeremy Lloyd	CONLIN	UNITED STATES	<i>SG-43</i>
4	Yaron	DANON	UNITED STATES	
5	Marie-Anne	DESCALLE	UNITED STATES	
6	Emmeric	DUPONT	FRANCE	<i>EG-HPRL</i>
7	Michael	FLEMING	NEA	<i>Secretariat</i>
8	Zhigang	GE	CHINA	<i>Remote</i>
9	Ayman	HAWARI	UNITED STATES	<i>SG-42</i>
10	Michal	HERMAN	UNITED STATES	
11	Jesse	HOLMES	UNITED STATES	
12	Tatiana	IVANOVA	NEA	
13	Osamu	IWAMOTO	JAPAN	
14	Nobuyuki	IWAMOTO	JAPAN	
15	Robert	JACQMIN	FRANCE	
16	Atsushi	KIMURA	JAPAN	
17	Arjan	KONING	IAEA	<i>Remote</i>
18	Luiz Carlos	LEAL	FRANCE	
19	Fausto	MALVAGI	FRANCE	<i>SG-43</i>
20	Caleb	MATTOON	UNITED STATES	<i>SG-43</i>
21	Gilles	NOGUERE	FRANCE	<i>SG-42</i>
22	Giuseppe	PALMIOTTI	UNITED STATES	<i>SG-46</i>
23	Arjan	PLOMPEN	EUROPEAN COMMISSION	<i>Chair</i>
24	Dimitri	ROCHMAN	SWITZERLAND	
25	Evgeny	ROZHIKHIN	RUSSIA	
26	Xichao	RUAN	CHINA	<i>Remote</i>
27	Vladimir	SOBES	UNITED STATES	<i>SG-44</i>
28	Alejandro	SONZOGNI	UNITED STATES	
29	Andrej	TRKOV	IAEA	
30	Morgan	WHITE	UNITED STATES	<i>SG-45</i>
31	Kenji	YOKOYAMA	JAPAN	
32	Michael	ZERKLE	UNITED STATES	

Itinerary

6/22/19 - 6/23/19	Travel from Albany, NY to Paris France
6/24/19 - 6/24/19	SG-44 (Covariance), attended meeting
6/25/19 - 6/25/19	SG-C (HPRL), attended meeting
6/26/19 - 6/26/19	SG-45 (VANDAL), attended meeting
6/27/19 - 6/28/19	WPEC Meeting in NEA, Danon attended both days
6/30/18 - 6/30/19	Travel from Paris France to Albany, NY

DISTRIBUTION

1. Lori Scott (Lorisc0tt@aol.com)
2. Douglas Bowen (bowendg@ornl.gov)
3. Angela Chambersn (Angela.Chambers@mnsa.doe.gov)